

VII. OTHER ISSUES

This chapter addresses miscellaneous issues concerning Federal, State, and local regulation of stationary IC engines, nonroad engines, and portable engines as well as the control of toxic emissions from these engines.

A. Effect of District, ARB, and U.S. EPA Regulations

The districts in California have primary responsibility for control of air pollution from stationary sources. Thus, districts have the authority to adopt rules and regulations controlling emissions from IC engines that are stationary sources. The ARB and U.S. EPA also have authority to control emissions from certain engines, including motor vehicle engines, nonroad (off-road) engines, and other types of engines. The California Health and Safety Code authorizes the ARB to adopt standards and regulations for motor vehicles and for certain off-road or nonvehicle engine categories, including farm equipment and construction equipment. Under the federal Clean Air Act, the U.S. EPA has authority to control emissions from stationary sources and from mobile sources, including nonroad engines. The U.S. EPA may authorize California to enforce requirements for certain motor vehicle engines and nonroad engines if standards are at least as protective as applicable federal standards. U.S. EPA has granted such waivers to California for a number of engine categories.

1. ARB IC Engine Regulations

Two major provisions in State law authorize the ARB to control emissions from nonvehicular IC engines. The first of these, Section 43013 of the Health and Safety Code, grants the ARB authority to adopt standards and regulations for a wide variety of off-road or nonvehicle engines. These include off-highway motorcycles, off-highway vehicles, construction equipment, farm equipment, utility engines, locomotives, and marine vessels. Under Section 43013, the ARB has adopted regulations for several engine categories, including small off-road engines, large off-road spark ignition engines, and portable engines. Some of these engines could be used in applications where the engines are considered to be stationary sources. In such situations, the ARB staff has concluded that the district holds jurisdiction, and the engine must comply with district rules and regulations.

The second major provision in State law regarding ARB authority to control emissions from nonvehicular IC engines can be found in Health and Safety Code sections 41750 through 41755. These sections require the ARB to develop uniform statewide regulations for the registration and control of emissions from portable engines. ARB adopted regulations on March 27, 1997, which became effective September 17, 1997. It should be noted that this RACT/BARCT determination for stationary IC engines exempts all portable engines if they are registered either with a local district or under the statewide registration program described in the following paragraph.

The Statewide Portable Equipment Registration Program establishes a uniform program for portable engines and portable engine-driven equipment units. Once registered, engines and equipment units may operate throughout California without the need to obtain individual permits

from local air districts. Districts are pre-empted from permitting, registering, or regulating portable engines and portable equipment units registered with the ARB. However, local districts are responsible for enforcing the Program. The Statewide Portable Equipment Registration Program Regulations can be found in sections 2450 through 2466, title 13, California Code of Regulations.

The California Clean Air Act (CCAA) requires districts that are unable to achieve five percent annual emission reductions to demonstrate to the ARB's satisfaction that it has included every feasible measure in its clean air plan and an expeditious adoption schedule for these measures. ARB interprets the adoption of every feasible measure to mean, at a minimum, that districts consider regulations that have been successfully implemented elsewhere. Districts should also consider going beyond what has already been accomplished by evaluating new technologies and innovative approaches that might offer potential emission reductions. In addition, districts should consider not only technological factors, but social, environmental, and energy factors within the district, as well as cost-effectiveness and the district's ability to realistically adopt, implement, and enforce measures. The use of RACT/BARCT standards on existing stationary sources is one of the feasible measures required by the CCAA. Furthermore, districts may require the repowering or replacement of IC engines with cleaner IC engines or electric motors under every feasible measure. In these situations, it is recommended that districts consider electrification whenever it is feasible in order to maximize emission reductions.

2. U.S. EPA IC Engine Regulations

A district's ability to control emissions from stationary IC engines may be affected by federal regulations for nonroad engines. Effective July 18, 1994, the U.S. EPA promulgated 40 CFR Part 89-- Control of Emissions from New and In-use Nonroad Engines. In 40 CFR 89.2, U.S. EPA adopted a definition of nonroad engine that distinguishes between stationary and nonroad sources for purposes of federal regulation. Under the federal definition, nonroad engines are IC engines that are in or on equipment that is self-propelled or are portable. However, if a portable IC engine remains at one location for more than 12 months (or, for a seasonal source, the duration of the season), it is not a nonroad engine and may be considered a stationary source. On the other hand, if the engine moves within 12 months (or, for a seasonal source, during the season), even if the move is within the boundaries of a single site, the engine may be considered a nonroad engine. Examples of nonroad engine applications are bulldozers, lawnmowers, or agricultural engines that are on trailers. 40 CFR Part 89 should be consulted for a more detailed explanation of the federal definition of nonroad engine.

Under the federal Clean Air Act and U.S. EPA definitions, a district may have adopted definitions that differ from U.S. EPA definitions and therefore, in certain circumstances, may consider a nonroad engine to be a stationary source in certain circumstances.

Under the federal Clean Air Act Amendments of 1990, the U.S. EPA is authorized to regulate newly manufactured nonroad engines. In general, the CAA amendments expressly prohibit states (including districts) from adopting emissions standards or other control technology requirements for nonroad engines [CAA, section 209(e)]. However, Congress provided in the CAA that California, upon receiving authorization from the U.S. EPA, could

PRELIMINARY DRAFT - DO NOT CITE OR QUOTE

adopt and enforce standards and regulations for most categories of nonroad engines if the requirements are at least as protective as the applicable federal standards. (However, all states, including California, are preempted from setting emission standards for new nonroad engines that are less than 175 horsepower and are used in farm or construction vehicles or equipment).

In accordance with U.S. EPA preemption provisions, this proposed RACT/BARCT determination exempts from rule requirements engines that meet the U.S. EPA definition for new nonroad engines that are less than 175 horsepower and used in construction or farm equipment or vehicles.

Owners or operators of IC engines may also be subject to Title V of the Federal Clean Air Act. Title V requires California air districts to develop and implement local operating permit programs for major stationary sources. Title V applicability may vary depending on a source's location and the type and potential amount of air pollutants emitted. In the San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD), the major source applicability thresholds are currently 50 tons per year (TPY) for NO_x and VOC (If the district is reclassified from serious to severe nonattainment with respect to national ambient air quality standards, the major source thresholds for NO_x and VOC will change from 50 TPY to 25 TPY). For PM₁₀ and SO_x the major source threshold in the SJVAPCD is 70 TPY.

B. Emissions of Hazardous Air Pollutants/Toxic Air Contaminants

1. Hazardous Air Pollutants/Toxic Air Contaminants Emitted

Fuels used in stationary IC engines and exhaust gases from these engines contain toxic substances. These substances are labeled hazardous air pollutants (HAPs) by the U.S. EPA and toxic air contaminants (TACs) by the ARB. A TAC is defined in Health and Safety Code as an air pollutant which may cause or contribute to an increase in mortality or in serious illness, or which may pose a present or potential hazard to human health. In April 1993, the ARB designated all HAPs listed in subsection (b) of Section 112 of the federal CAA as TACs. Toxic substances differ from criteria pollutants such as NO_x, CO, SO_x, and particulate matter because of the large number of substances that are potentially toxic and identified threshold or safe levels for many toxics. In addition, toxic substances tend to be emitted in much smaller amounts than criteria pollutants, but their toxicity tends to be much greater.

Emissions of toxic substances from the exhaust of natural gas-fired engines are the result of incomplete combustion. These toxic substances include: propylene, formaldehyde, polycyclic aromatic hydrocarbons (PAHs), acetaldehyde, acrolein, benzene, ethyl benzene, toluene, and xylenes. The toxic substances having the highest mass emissions are generally formaldehyde, propylene, and benzene.

HAP emissions are also regulated by Title V. For sources HAPs in all districts, the major source threshold is 10 TPY of a single HAP or 25 TPY of a combination of HAPs.

PRELIMINARY DRAFT - DO NOT CITE OR QUOTE

2. U.S. EPA Requirements

The source category list published by U.S. EPA under CAA section 112(b) requires the MACT standard for stationary reciprocating IC engines to be promulgated by November 15, 2000. Once U.S. EPA promulgates a MACT standard, it becomes an air toxic control measure (ATCM) under state law, unless an ATCM for the source category has already been adopted. The U.S. EPA developed the Industrial Combustion Coordinated Rulemaking (ICCR) process to develop MACT standards for combustion sources. This process, started in 1996, gathered representatives of industry, environmental groups, and state and local regulatory agencies together to develop MACT standards for industrial and commercial heaters, boilers, and steam generators, gas turbines, and IC engines. U.S. EPA is planning on releasing a proposed MACT standard for reciprocating IC engines in November 2000.

3. State and District Requirements

The State and districts have had, for a number of decades, the authority to control air toxics that pose a health hazard. However, the formal framework for setting emission limits for air toxics was not in place until enactment of the Toxic Air Contaminant Identification and Control Act (AB 1807) in 1983. In 1987, passage of the Air Toxics "Hot Spots" Information and Assessment Act (AB 2588) expanded the role of the ARB and districts by requiring a statewide air toxics inventory and assessment, and notification to local residents of significant risk from nearby sources of air toxics. In 1992, SB 1731 required owners of certain significant risk facilities identified under AB 2588 to reduce the risk below the level of significance.

4. Emission Rates of HAPs/TACs

A number of sources are available for estimating the emission rates for HAPs and TACs from IC engines. Using the formaldehyde emission factors listed in Ventura County APCD's AB 2588 Combustion Emission Factors document, the 10 tons per year major source threshold under the federal CAA may be exceeded if a facility has natural gas-fired engines with a combined rating exceeding about 8,000 horsepower. If this major source threshold is exceeded for an engine that is a stationary source, the engine is subject to federal MACT standards. More recent source testing of engines using natural gas, landfill gas, or field gas indicates the 10 tons per year may be exceeded if a facility has engines with a combined rating as low as 4,000 horsepower. This is a worse plausible case, though, as these tests also indicate some facilities may not exceed 10 tons until the combined horsepower rating is as high as 200,000. These data demonstrate that emission rates of HAPs can vary greatly, depending on the type of gaseous fuel, and the design and operating parameters of each individual engine.

5. Control of HAPs/TACs

The toxic substances of most concern emitted from stationary engines burning gaseous fuels are VOCs. These VOCs are the result of incomplete combustion, and can be reduced by methods that either improve combustion inside the engine or destroy VOCs in the exhaust. The VOC emission limits found in this proposed determination will help limit emissions of toxic compounds that are also VOCs.

One of the more popular and effective VOC exhaust control methods for IC engines is the oxidation catalyst. Oxidation catalysts have been shown to reduce VOC emissions by over 90 percent for natural gas-fired engines. Testing conducted on SI engines fueled by liquified petroleum gas and gasoline and with three-way catalysts have indicated substantial reductions in emissions of formaldehyde, acetaldehyde, benzene, 1,3 butadiene, and styrene, all classified as VOCs and HAPs. U.S. EPA's ICCR effort is in the process of testing natural-gas-fired IC engines to determine the effectiveness of oxidation catalysts in controlling HAPs. This testing also will include a rich burn engine with a three-way NSCR catalyst.

Engine modifications that promote complete combustion will reduce emissions of VOCs, thereby also reducing emissions of toxic substances that are VOCs. These engine modifications for natural gas-fired engines include operation of the engine with a lean (but not excessively lean) air/fuel ratio, and the use of improved ignition systems. However, operating an engine slightly lean will tend to maximize NO_x emissions.